RECENT OBSERVATIONS OF THE SATELLITES OF *JUPITER.*

In *Astronomy and Astro-Physics* for April, 1894 (page 272), and in the *Monthly Notices*, R. A. S., for January, 1894 (page 134), Dr. BARNARD has two papers on his recent observations of the satellites of *Jupiter*. The following points are especially interesting in connection with previous observations on the same subject:

First.—The remarkable results announced in 1893 by Professor WILLIAM PICKERING with regard to the forms, rotations and behavior of these bodies are not confirmed by Dr. BARNARD. In this respect his conclusions entirely agree with those of Professor SCHAEBERLE, previously printed in the *Publications* A. S. P., Vol. V, page 182, dated September, 1893. In order that Professor PICKERING'S conclusions may be accepted, it will be necessary for him to verify the results he obtained in South America during 1892 by renewed observations, with a different object-glass, at his new station in Arizona, or elsewhere, and it seems to be required that some of the large instruments, now so plentiful, should confirm his conclusions.

Second.—In these *Publications*, Vol. III, pages 355 and 359, Professors SCHAEBERLE and CAMPBELL described markings on Satellite III of *Jupiter*, and announced that Satellite I "is ellipsoidal, that its largest axis is directed towards the center of *Jupiter*, and that the other satellites appear to be spherical." Dr. BARNARD'S conclusions are that all the satellites, including I, are spherical. Professors SCHAEBERLE and CAMPBELL have continued their observations since 1891, and have, so far, seen no reason to change their conclusions above given, so far as I know. In the same paper they conclude that the periods of axial rotation and of revolution of Satellite I are equal. Dr. BARNARD says that his observations (as yet unpublished) lead to a different result.

Third.—The appearance of Satellite I in transit as a double body, as observed in 1890 by Professors BURNHAM and BARNARD, is now explained by Dr. BARNARD as due to simple contrasts between bright regions on the planet and two extensive dusky polar caps on the satellite (which are separated by a brighter belt).*

The simple theory of contrast is probably fully adequate to explain all observed appearances of the phenomena of the transits of the satellites (dark transits, etc.), as has been pointed out in

* This bright belt was repeatedly observed by Messrs. SCHAEBERLE and CAMPBELL in 1891.

the *Publications* A. S. P., Vol. II (1890), page 296; Vol. III (1891), page 358, and in other places.

Fourth.—Dr. BARNARD next considers the transparency of the limb of *Jupiter* with reference to the question whether the light of a satellite undergoing occultation can be seen through the planet's atmosphere, and says "I think it is high time that astronomers reject the idea that the satellites of *Jupiter* can be seen through his limb" since under good conditions, with the 36-inch telescope, "the limb of *Jupiter* has appeared perfectly opaque, as in all my previous observations with smaller telescopes."

It is quite possible that the limb of *Jupiter* is really opaque to the light of satellites or stars, but it does not always appear to be so. Dr. BARNARD has himself described the appearance of a star at occultation shining through the atmosphere of the planet (see *Astronomical Journal*, Vol. VIII, page 64), though the observation had probably escaped his memory when he wrote the sentence just quoted. It is conceivable that the observations of satellites which he criticises were due to the same causes which affected his own observations of the star in question. At any rate his words "the star was last seen with three-quarters of its disc within the limb" of *Jupiter*, show that good observers have sometimes recorded appearances of the kind.

These few points from recent papers show very forcibly that everything is not yet settled with respect to *Jupiter's* satellite system, and may serve to direct the attention of the possessors of large telescopes to some of the problems involved.

April 10, 1894. E. S. H.

ERRATUM IN *PUBLICATIONS*, NO. 32.

In *Publications*, No. 32, Vol. V., 1893, page 204, the name of the discoverers of Comet *b*, 1893, should have been printed in the order of discovery, thus, SPERRA, ROSO DE LUNA, { MILLER, JOHNSON, } RORDAME, QUÉNISSET, instead of in the order in which notices of their discoveries came to the knowledge of the Committee on the Comet-Medal. THE COMMITTEE.

VISITOR TO THE LICK OBSERVATORY.

Hon. BENJAMIN HARRISON, lately President of the United States, and now Lecturer on Constitutional Law at the STANFORD University, visited the Observatory on April 12 and 13.